

## EFFECTS OF FLUORIDE ON NEUROTRANSMITTERS IN BRAIN REGIONS OF RATS EXPOSED TO FLUORIDE IN DRINKING WATER FOR TWO MONTHS

Fluoride has long been known as an environmental pollutant. Toxic neurological effects of fluoride have been reported in experimental animals by oral exposure to fluoride, but effects on neural transmitters are not clear. Adult male rats were administered fluoride via their drinking water at concentrations of 0, 50, 100, and 200 ppm (as fluoride ion) for 2 months. Following the treatment period, the body weights of the rats were checked, and their brains, livers, kidneys, and spleens were sampled. The brain samples were dissected into seven regions: cerebrum, cerebellum, medulla oblongata, midbrain, corpus striatum, hypothalamus, and hippocampus. The levels of the catecholamines, norepinephrine (NE), dopamine (DA), DA metabolites dihydroxyphenylacetic acid (DOPAC) and homovallic acid, and those of serotonin (5-hydroxytryptamine) and its metabolite 5-hydroxyindoleacetic acid (5-HIAA) in each brain region, were simultaneously determined by high performance liquid chromatography (HPLC) with an electrochemical detector. The mean body weight in the 200-ppm group was significantly lower than in the control, 50-ppm, and 100-ppm groups. There were no significant differences among the groups for liver, kidney, or spleen weights. The mean values of NE in the medulla of the 100-ppm and 200-ppm groups were significantly lower than those in the control and 50-ppm groups. The mean values of 5-HIAA in the 100-ppm and 200-ppm groups were significantly lower than that in the 50-ppm group. However, they were also significantly lower than that in the control. The mean values of DA in the medulla in the 100-ppm and 200-ppm groups were significantly lower than that in the 50-ppm group and tended to be lower than that in the control. No significant differences were observed in the levels of the neurotransmitters and their metabolites in other brain regions. The mean value of DOPAC/DA ratio in the midbrain in the 50-ppm group was significantly higher than that in the control, 100-ppm and 200-ppm groups. The administration of fluoride at the concentration of 200 ppm in the drinking water for 2 months clearly inhibited increase in body weight. However, under the experimental conditions reported here, significant alterations in the neurotransmitters and their metabolites were observed in limited regions but were not dose dependent. The neurotoxic effects of fluoride by oral exposure in adult rats over a two-month period may therefore not be strong.

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